Annual Report 2019/20

West Wimmera Groundwater Management Area

July 2019 to June 2020

EXECUTIVE SUMMARY

The Local Management Plan (LMP) for West Wimmera GMA was approved by the GWMWater Board in July 2019. The LMP draws together the local management rules from the 2011 West Wimmera Groundwater Management Strategy, with adaptations and amendments based on recommendations of the 2018 technical review. It also includes updated information relevant to management decisions in the area. The West Wimmera Local Management Plan is now the primary reference document for groundwater management in the West Wimmera area and can be found on the GWMWater website www.gwmwater.org.au/WW-GMA.

This report details GWMWater's activities in administering the LMP for the West Wimmera Groundwater Management Area during the period 1 July 2019 to 30 June 2020. It is available online at www.gwmwater.org.au/about-us/annual-reports.

Status of the Groundwater Resource

Groundwater levels and metered extraction continue to be monitored in the West Wimmera Groundwater Management Area (GMA). The data indicates that groundwater levels are responding to the level of extraction as expected. Where there is intensive extraction and use, there is a decline in groundwater level (such as Neuarpur), and where extraction is more disperse, groundwater levels are generally stable. Salinity remains relatively stable based on samples obtained.

Groundwater extraction and use

A total volume of 24,520 megalitres (ML) was extracted from the Tertiary Limestone Aquifer in 2019/20, which is less than half of the total licensed volume in the GMA. Overall, the volume extracted was 2,219 ML less than the previous year.

Restrictions

All licences in Neuarpur Sub-zone 1 were restricted to 80% of entitlement in 2019/20. This restriction level will remain for season 2020/21.

Compliance and Enforcement

In May 2020, the Victorian Government confirmed its commitment to a zero tolerance approach for unauthorised water take (also known as 'overuse'). GWMWater's Compliance and Enforcement Strategy details our approach to compliance and enforcement across surface water and groundwater sources (available at www.gwmwater.org.au/ces).

There were a small number of non-compliances detected during the year (primarily unauthorised take or 'overuse'), however all matters were resolved, with no outstanding or unresolved compliance matters in the West Wimmera GMA at 30 June 2020.

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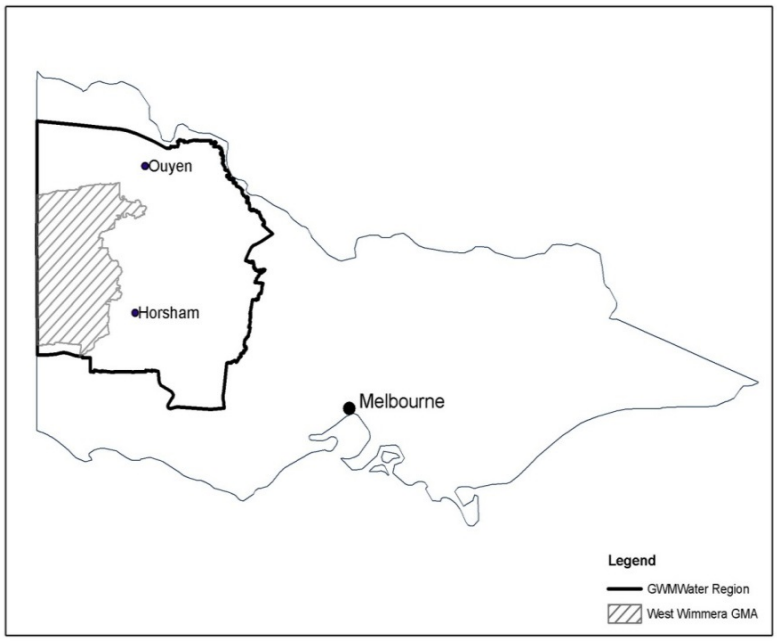
1. Introduction

This report provides an overview of groundwater management activities undertaken in the West Wimmera Groundwater Management Area (GMA) during the period 1 July 2019 to 30 June 2020.

The West Wimmera GMA is located in the far west of Victoria (as indicated in Figure 1), extending from north of the Glenelg River to the Big Desert, and east from the South Australian border to the Wimmera River. Groundwater is the primary source of water for irrigation, urban, stock and domestic supply in the GMA.

Figure 1: Location of West Wimmera GMA



The West Wimmera GMA is generally underlain by three main aquifers which vary in thickness, yield and water quality. The aquifers are the shallow Pliocene (Parilla) Sands Aquifer (PSA), Tertiary Limestone Aquifer (TLA) and the deeper Tertiary Confined Sands Aquifer (TCSA). For much of the area there are layers of clay between the aquifers.

The Tertiary Limestone Aquifer (TLA) is the focus for groundwater management in the West Wimmera GMA. The TLA is the resource that is primarily used for stock and domestic, irrigation and town supplies across the area, due to its water quality and yield.

The status of the groundwater resource varies within the West Wimmera GMA. Most of the GMA shows stable groundwater trends, however, some parts have been exhibiting declining groundwater levels. Management zones have been established within the GMA to represent areas that have common management requirements. These are based on hydrogeology, the management objective (stable groundwater trends) or other distinguishing characteristic, such as intensity of licences and extractions.

The objective of groundwater management in the GMA is to ensure the groundwater resource of the area is managed in an equitable manner to achieve the long-term sustainability of the resource and maintain the social, environmental and economic benefits that groundwater provides to the region.

As represented in Figure 2, the management zones for the West Wimmera GMA are:

- Big Desert
- Northern (including Yanipy sub-zone)
- Little Desert
- Neuarpur Zone (sub-zones 1 and 2)
- Gymbowen
- Southern, with sub-zones Apsley, Langkoop, Edenhope and Ullswater

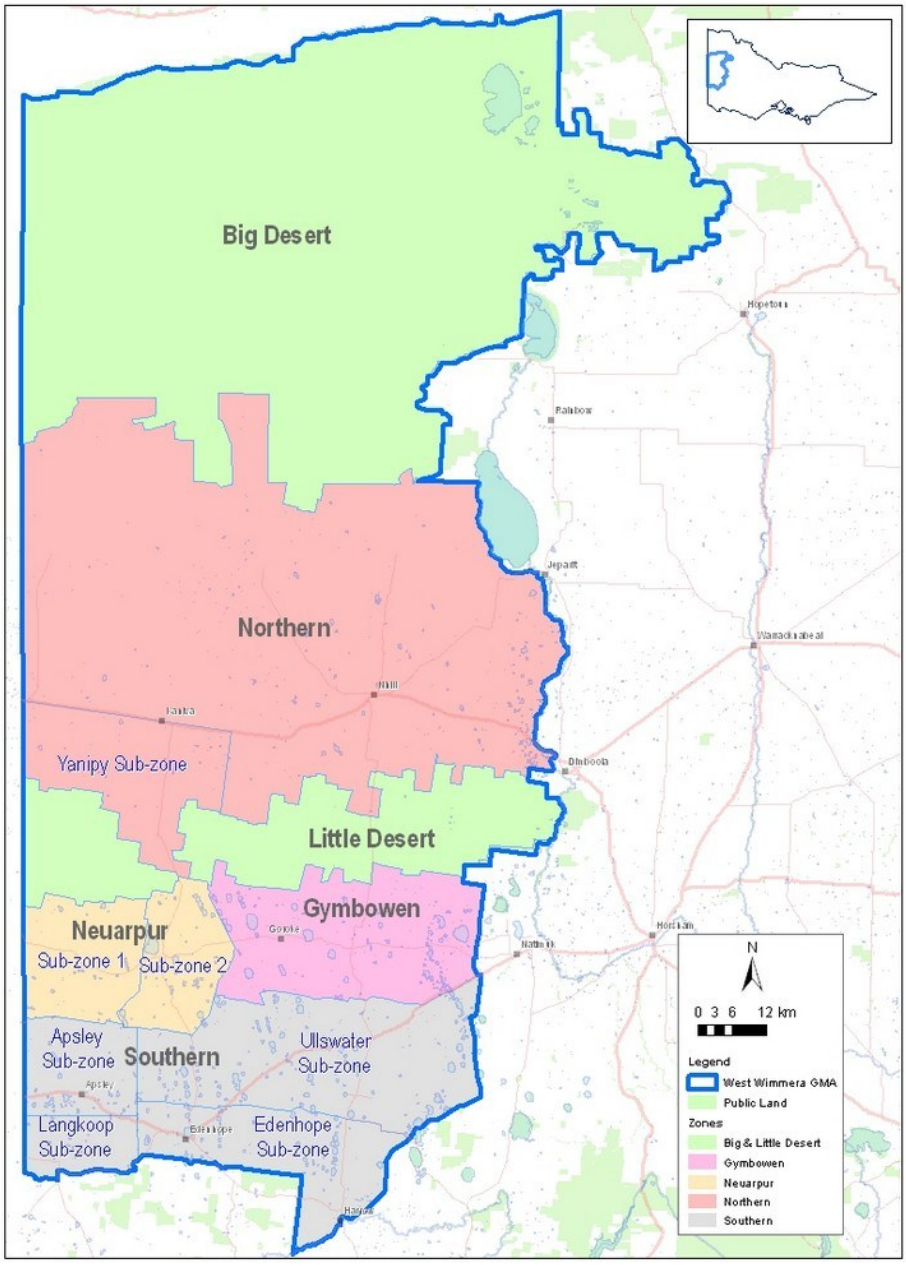


Figure 2: Management Zones of the West Wimmera GMA

2. Groundwater Management

2.1. Entitlement Limits

Under the provisions of the *Water Act 1989* the Minister for Water declares the Permissible Consumptive Volume (PCV) for an area or water system. The PCV sets the limits on volumes that can be taken under licence for a defined period of time. The PCV for the West Wimmera GMA is outlined in Table 1.

Table 1: Permissible Consumptive Volume (PCV) for all aquifers

West Wimmera GMA Zone or Sub-zone	Pliocene Sands Aquifer PCV in ML	Tertiary Limestone Aquifer PCV in ML	Tertiary Confined Sand Aquifer PCV in ML	All other formations PCV in ML
Big Desert Zone	0	25	0	0
Gymbowen Zone	50	2,000	200	0
Little Desert Zone	0	25	0	0
Neuarpur Zone				
• Neuarpur Sub-zone 1	0	20,700	200	0
• Neuarpur Sub-zone 2	0	4,050	200	0
Northern Zone	50	22,390	500	0
• Yanipy Sub-zone		(6,103*)		
Southern Zone				
• Apsley Sub-zone	0	2,901	200	0
• Edenhope Sub-zone	50	680	50	0
• Langkoop Sub-zone	0	2,000	100	0
• Ullswater Sub-zone	50	888	100	0

*the PCV for Yanipy Sub-zone is included in the overall Northern Zone PCV

2.2. Licensed volume

A summary of licensed volume in the West Wimmera GMA is outlined in Table 2. Further detailed information may be obtained from the Victorian Water Register http://waterregister.vic.gov.au/. During the year, two licences in the Northern Zone were surrendered for a total volume of 10ML. One new licence (100ML) was issued in the Gymbowen Zone as a result of a sale of unallocated groundwater process.

Table 2: Summary of Licences as at 30 June 2020

Management Zone	Number of Licences	Licensed volume (ML)
Neuarpur	*48*	*24,691*
Northern	*73*	*22,330*
Southern	*35*	*5,615*
Gymbowen	*11*	*1,052*
Total	***167***	***53,688***

2.3. Groundwater use

Each irrigation bore and active commercial bore is fitted with a meter approved by the Authority (GWMWater) to measure extraction. Groundwater users are encouraged to actively monitor their extraction volume throughout the season. GWMWater uses metering data and extraction information for water resource management and licence compliance purposes. Annual extraction volumes are uploaded to the Victorian Water Register on 30 June each year.

Meters in Neuarpur and Apsley can be read remotely as required, while manual readings are taken for the remaining meters. In most cases manual readings are taken twice yearly, once in January/February (mid-irrigation season) with end of season readings taken in June. Domestic and stock use is not metered.

To access additional water during the season, licensees must secure water from another licence holder by way of trade or transfer. Any such trade or transfer must be approved by GWMWater prior to the taking of additional water volumes.

There are currently 166 groundwater licences in the West Wimmera GMA with a total licence entitlement volume of 53,688 ML. The volume available for extraction was 51,911 ML which takes into account any carryover volume, and the restricted volume available in Neuarpur sub-zone 1 (discussed further in section 2.4 Restrictions).

This year (2019/20), 100 licences were active and extracted a total volume of 24,520 ML (see Table 3 for use by zone). Extraction for irrigation and commercial purposes accounted for 23,852 ML, while 668 ML was used for town supply. The total volume used was approximately 3,000 ML less than that reported for the previous year (2018/19), which was 26,739 ML. The 3,000 ML difference was mostly in Neuarpur sub–zone 1 (see Table 4 and Figure 3 for a summary of usage in past years).

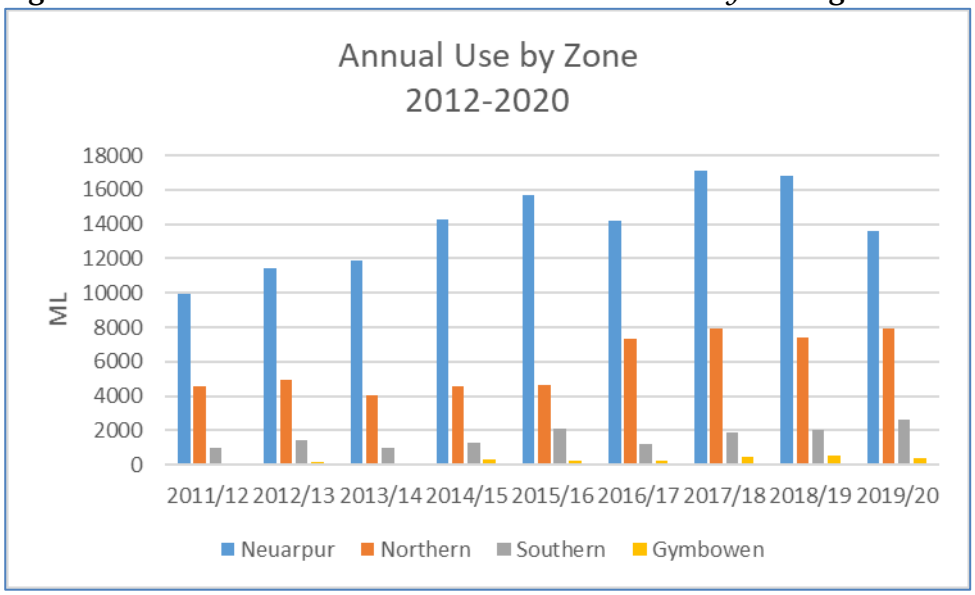
Table 3: Summary of groundwater extractions by management zone 2019/20.

Zone	No of licences	Permanent Entitlement Volume ML	Extraction (Usage) 2019/20 ML
Neuarpur	48	24,691	13,590
Northern	73	22,330	7,948
Southern	35	5,615	2,605
Gymbowen	11	1,052	377
TOTAL	**166**	**53,688**	**24,520**

Table 4: Summary of groundwater extractions by management zone since 2011/12

Zone	Permanent Entitlement Volume ML	Extraction/Use (ML)								
		2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
Neuarpur	24,691	9,947	11,410	11,868	14,246	15,676	14,223	17,086	16,784	13,590
Northern	22,330	4,040	4,901	4,053	4,589	4,611	7,353	7,920	7,409	7,948
Southern	5,615	831	1,440	975	1,294	2,102.5	1,212	1,858	2,049	2,605
Gymbowen	1,052	29	164	69	291	268.5	209	446	497	377
TOTAL	**53,688**	**14,847**	**17,915**	**16,965**	**20,420**	**22,658**	**22,998**	**27,310**	**26,739**	**24,520**

Figure 3: West Wimmera GMA annual extraction by management zone.



2.4. Restrictions

Restrictions are being used to manage groundwater use in Neuarpur sub-zone 1 to address the declining groundwater levels observed in that area.

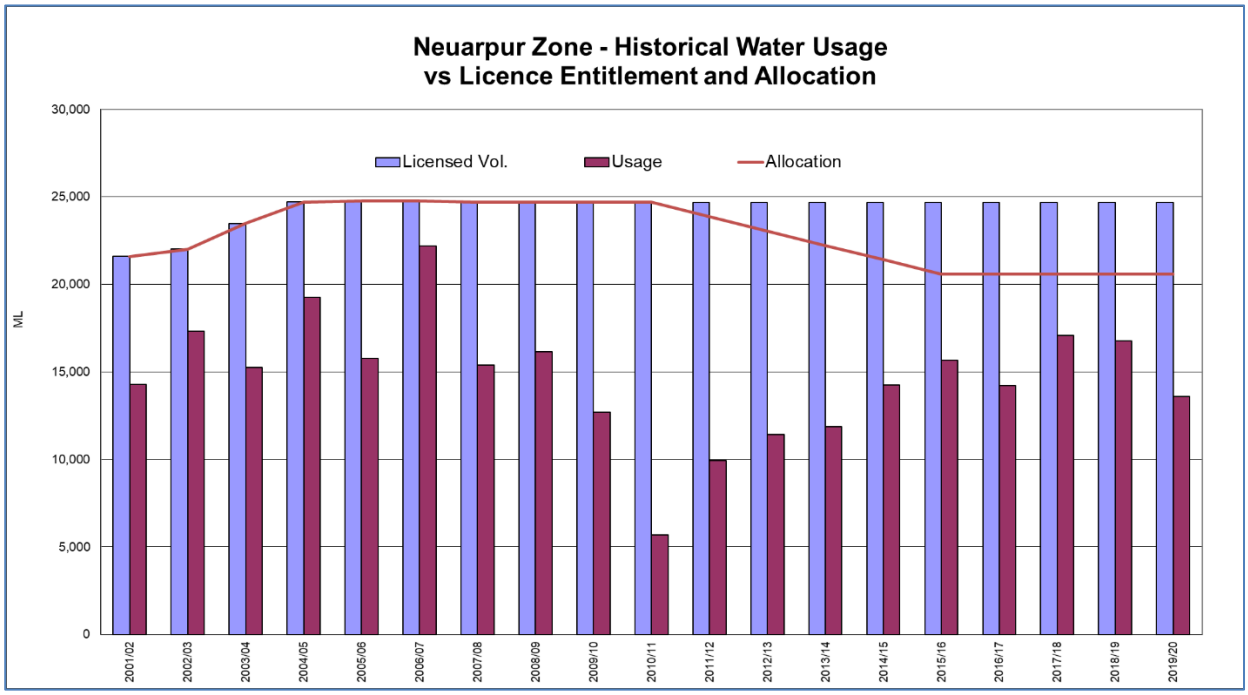
All licences in Neuarpur Sub-zone 1 were again restricted to 80% of entitlement in 2019/20, while licences within the remaining zones of the West Wimmera GMA have remained at 100% of licence entitlement.

As can be seen in Table 3, most water used in the West Wimmera GMA was extracted in the Neuarpur Zone. Figure 4 illustrates observed extraction as compared to the volume available for use over the past 17 years in the Neuarpur Zone.

While there is less water technically available due to the 80% restriction to entitlement, the reduced volume being extracted was not necessarily attributed to the restriction as the total extraction volume has not reached the total available restricted volume.

A method for assessing the need for and process for implementing any new restrictions for the remainder of the GMA is described within the West Wimmera GMA Local Management Plan (Section 7.2). There are no new restrictions foreshadowed in response to the observed change in groundwater level over recent years, based on this assessment.

Figure 4: Neuarpur Zone water use, licence entitlement volume and allocation over time.



2.5. Summary of groundwater trading 2019/20

Groundwater trading, either permanent or temporary, provides flexibility for new and existing users to manage production and in some cases establish new developments. Trading rules for the West Wimmera GMA have been established to maximise opportunities for groundwater trading, while preserving the management objective for each zone, protecting the integrity of the aquifer and minimising the potential for unacceptable impacts on existing groundwater users. Groundwater trades can usually occur within zones, however, no trade can occur into Neuarpur Sub-zone 1, nor either of the Yanipy, Apsley or Langkoop Sub-zones. Any trade or transfer must be approved by GWMWater prior to the taking of the additional water volumes.

During 2019/20 the following trades occurred:

- 20 temporary transfers of water entitlement, mostly in the Neuarpur Zone, to manage the volume of water available to these users.
- Two permanent trades of water entitlement for a total volume of 200 ML.
- One new licence was issued in the Gymbowen Zone for 100 ML as a result of the Sale of Unallocated Water process, which commenced in 2015.
- Two licences in the Northern Zone were surrendered, with a total entitlement volume of 10ML.

2.6. Carryover

Carryover provides the ability for a licence holder's unused allocation to be used in the following water year. Unused allocation to an upper limit of 30% licence volume may be carried over to the following year. In Neuarpur sub-zone 1, this equates to an upper limit of 30% of the total restricted volume available, while in the remainder of the GMA, licensees may carry over up to 30% of their full (un-restricted) licence entitlement, should it be unused. The end of season water usage statements issued by GWMWater provide licensees with information on the volume of carryover available for the following season.

2.7. Compliance and Enforcement

In May 2020, the Victorian Government confirmed its commitment to a zero tolerance approach for unauthorised water take. Unauthorised take typically occurs when water users draw beyond what they have in their account – even if they have the intention of squaring it up later. A factsheet outlining water use compliance and enforcement was included with each licensee's end of season water use statement.

Meter reading and compliance checks are conducted by GWMWater throughout the year. Should a licence holder fail to comply with the licence conditions, GWMWater will investigate the matter, and take any necessary action, in line with our Compliance and Enforcement Strategy (available at www.gwmwater.org.au/ces).

There were a small number of non-compliances detected during the year (primarily unauthorised take or 'overuse'). These instances were all investigated by GWMWater, with the necessary action taken by licensees to resolve all matters. There were no outstanding or unresolved compliance matters in the West Wimmera GMA at 30 June 2020.

2.8. Domestic and stock bores

Landholders can apply for a licence to construct a domestic and stock bore via the Victorian Water Register (http://waterregister.vic.gov.au/).

There were 79 bore construction licence issued for the construction or alteration of bores in the West Wimmera GMA in 2019/20. These may have included investigation bores as well as domestic and stock bores.

2.9. New Entitlement Volume

The 2015 Sale of Unallocated Water process came to an end last year. Applicants were required to have finalised their purchase by this time, by undertaking the necessary planning requirements and drilling an extraction bore. This year the final licence was issued from the process, being for a volume of 100ML.

GWMWater will determine the ongoing process for the sale of the remaining unallocated volumes available in the Gymbowen Zone, and Ullswater and Edenhope Sub-zones of the Southern Zone.

3. Groundwater Monitoring

3.1. Groundwater Levels

Groundwater levels are measured quarterly in dedicated observation bores located throughout the West Wimmera GMA. The bores are monitored by Ventia under the State Observation Bore Network monitoring contract, of which GWMWater is a partner.

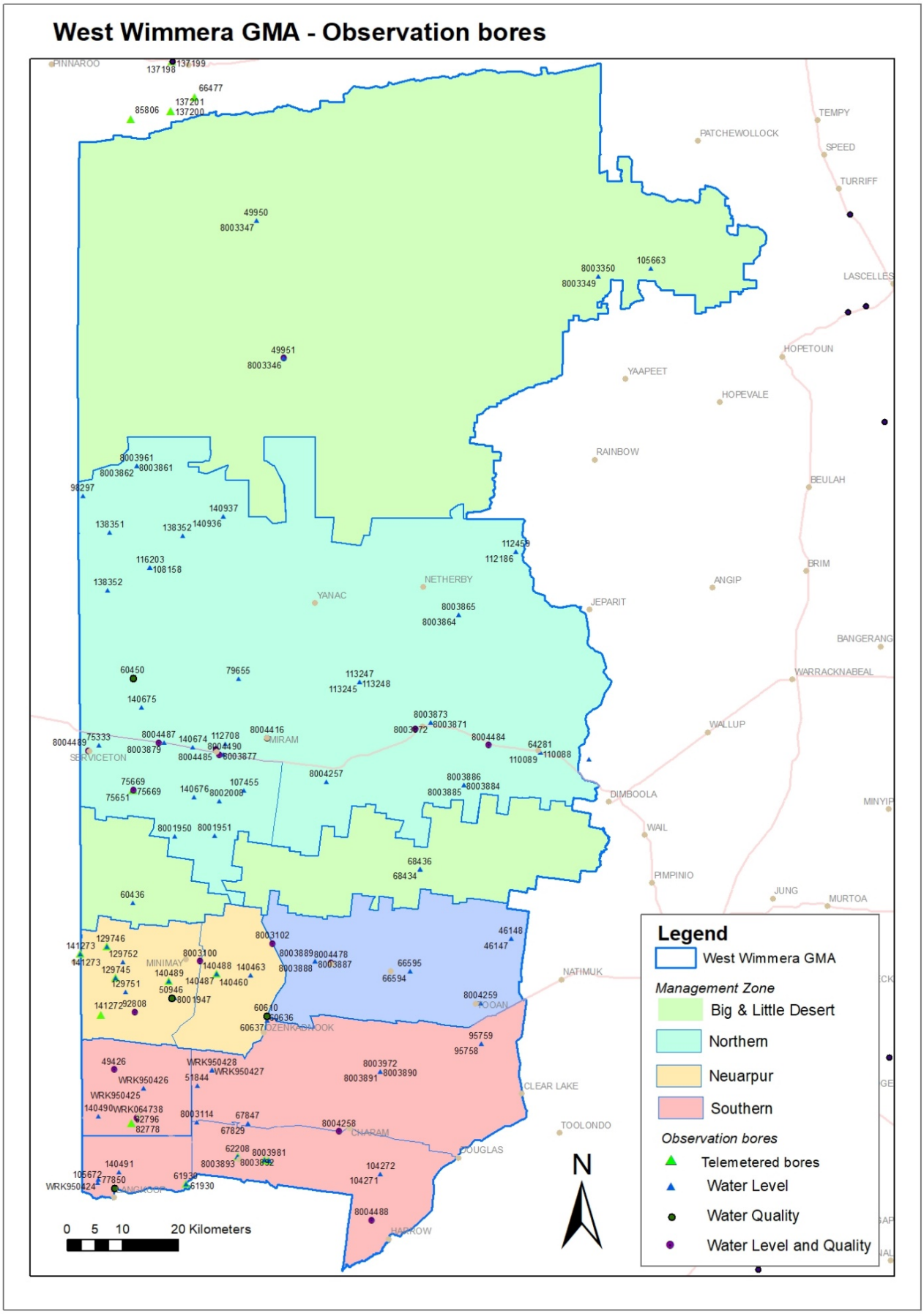
While there is an extensive observation bore network across the GMA, there are a greater number of observation bores located in the vicinity of concentrated groundwater extraction. Figure 5 illustrates the location of observation bores monitored during the 2019/20 period in the GMA. There are 15 observation bores that are telemetered and water level data is recorded and transmitted hourly.

Groundwater monitoring information is publicly available via DELWP Water Measurement Information System at http://data.water.vic.gov.au/. Graphs illustrating groundwater levels over time in a number of selected observation bores are illustrated in Appendix 1. Table 5 provides a summary of observed groundwater trends and status by zone (or sub-zone).

Table 5: Observed groundwater status over the 2019/20 period.

Zone/sub-zone	Groundwater Status 2020	Comment
Big Desert	Stable	Little to no groundwater extraction.
Northern	Generally stable	Yanipy sub-zone - seasonal trend of drawdown and recovery is evident in bores located close to where there is a higher volume extraction for irrigation. There has been some localised residual drawdown, however this has stabilised in recent years. Overall stable trend for the Northern zone.
Little Desert	Stable	Little to no groundwater extraction.
Neuarpur sub-zone 1	Declining	Declining, however, the rate of decline has reduced since 2010.
Neuarpur sub-zone 2	Generally stable	Generally stable, however closer to the western border ongoing minor decline exists.
Gymbowen	Stable	
Southern – Apsley and Langkoop,	Generally stable	Groundwater level in this zone are influenced both by climatic conditions and use within Victoria and South Australia. Some bores, particularly in the Langkoop sub-zone, are indicate a response to rainfall.
Southern - Edenhope	Stable	
Southern - Ullswater	Stable	

Figure 5: Observation bores monitored during 2019/20



3.1.1. Groundwater trend analysis

Appendix 1 includes representative hydrographs for the yearly trend analysis for the zones recognised by GHD in the 2018 technical review as being at moderately-high risk of not reaching the zones management objective of stable groundwater levels. These graphs allow changes in groundwater level trends to be assessed on an annual, 5 yearly, and long term basis. The methodology averages the change in groundwater level data and minimises potential bias by not being dependent on any one observation bore.

The cumulative graphs represent change in water level over time and illustrates a steadying in the downward trend in Neuarpur, slight annual decline in Apsley and Langkoop, and some recovery in levels in Yanipy, and Northern zones. With the exception of Neuarpur Sub-zone 1, Yanipy, Apsley and Langkoop are zones where an annual drawdown in excess of the trigger level of 0.1m has been recorded at least once in the last five years. However, this has not necessitated consideration of a management response as such levels have not been recorded in consecutive years, with stable or water level increase observed in the intervening years.

Overall there has been a continued decline of groundwater levels in Neuarpur Sub-zone 1 (hence the restriction to 80% of licence volume is to remain for 2020/21 season). In Neuarpur Sub-zone 2 the annual decline has remained within the acceptable threshold level.

Groundwater level in the Apsley and Langkoop sub-zones are influenced both by climatic conditions and use within Victoria and South Australia. These factors mean that the response in groundwater level tends to be relatively quick. In recent years, groundwater trends had shown signs of stabilisation within the Apsley and Langkoop sub-zones, however there has been a marginal decline in groundwater levels in these sub-zones this year. This co-insides with above average use (800ML above average) in the Apsley sub-zone.

In the Yanipy sub-zone, the limestone aquifer is confined and displays cyclic fluctuations in groundwater levels which requires assessment over an extended period; for example, 2018 shows a 0.5 metre drawdown, and a subsequent 0.3m recovery in 2019. The remainder of the Northern Zone exhibits relatively stable groundwater levels.

Stable groundwater levels are also observed in the Ullswater and Edenhope sub-zones, and the Gymbowen zone, where the volumes of groundwater extraction are relatively low.

3.2. Water Quality

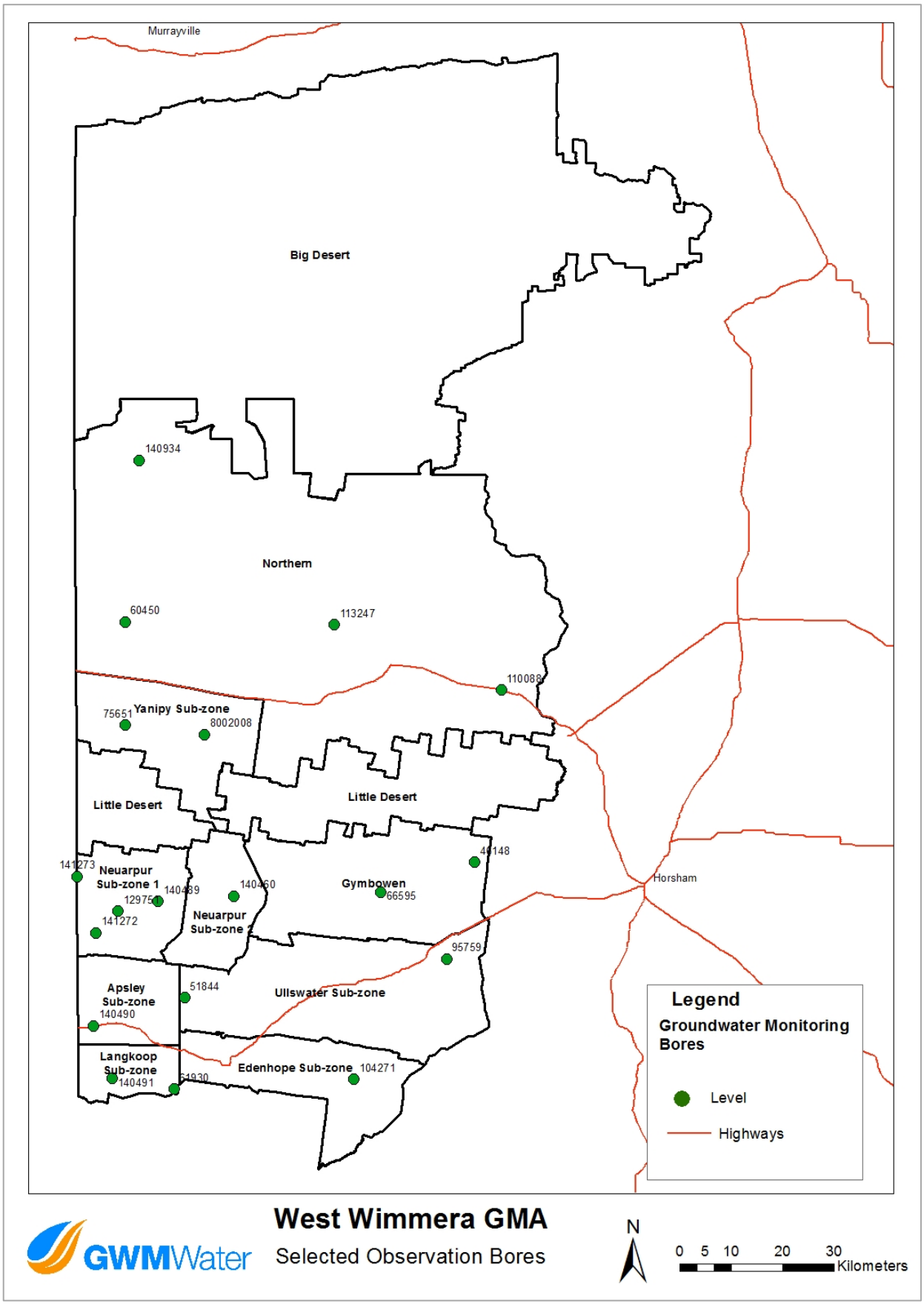
The location of bores screened in the Tertiary Limestone Aquifer (TLA) which are monitored regularly for salinity as part of the SOBN program are illustrated in Appendix 2. Graphs illustrating a selection of the bores where data is collected are also illustrated in Appendix 2.

In general, the salinity of the TLA is low and less than 1,500 EC units (uS/cm) or 1,000 mg/L of Total Dissolved Solids (TDS) through the middle section of the GMA, and less than 2,500 EC (1,500 mg/L TDS) across most of the remaining area. Towards the southern and northern boundaries, salinity typically ranges from 2,500 to 5,400 EC (1,500 to 3,500 mg/L TDS). There are small, isolated areas of higher salinity groundwater toward the south-west corner of the GMA and north of Kaniva.

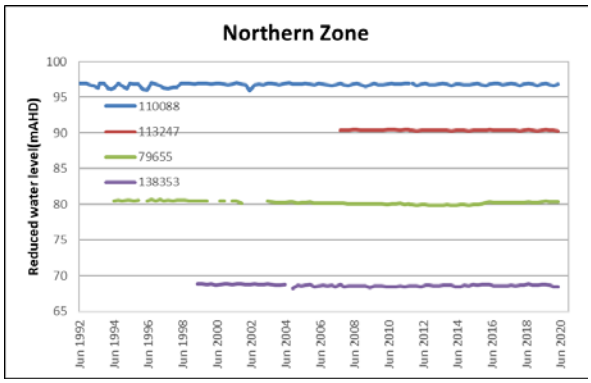
The salinity of groundwater appears to be relatively stable in most of the bores and has not been identified as a resource management issue at this time.

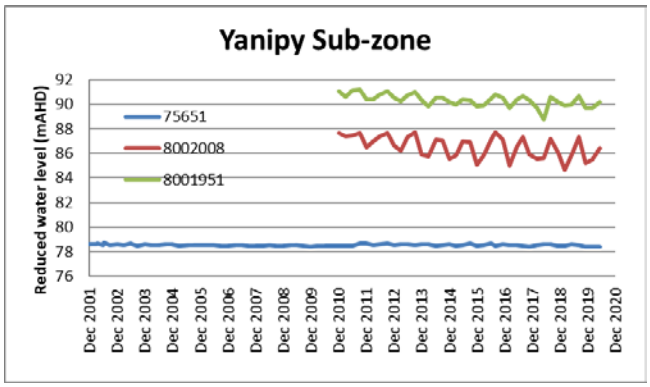
Appendix 1

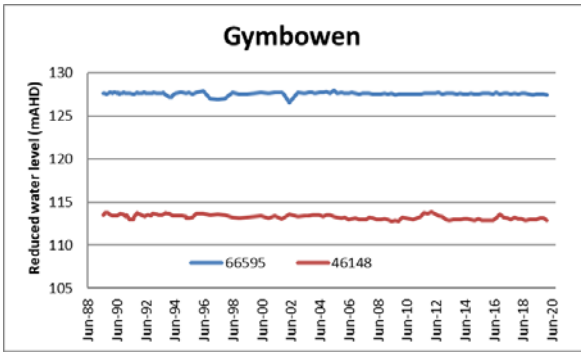
A1.1: Locations of observation bores

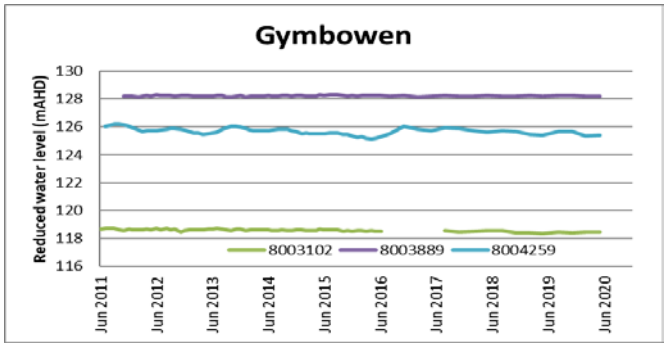


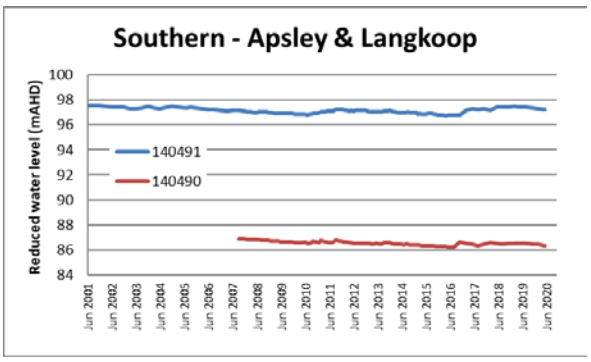
A1.2: Observed Groundwater Levels

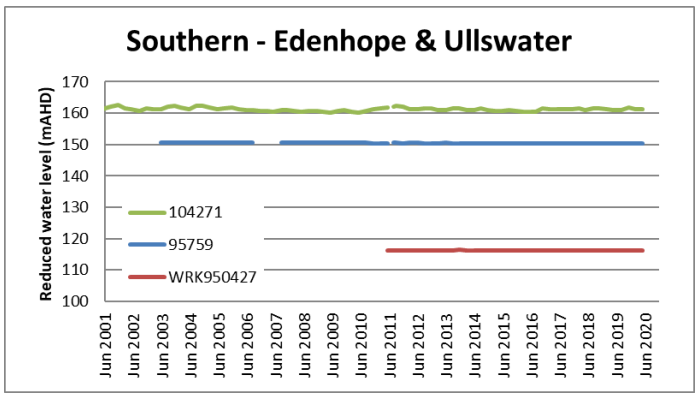


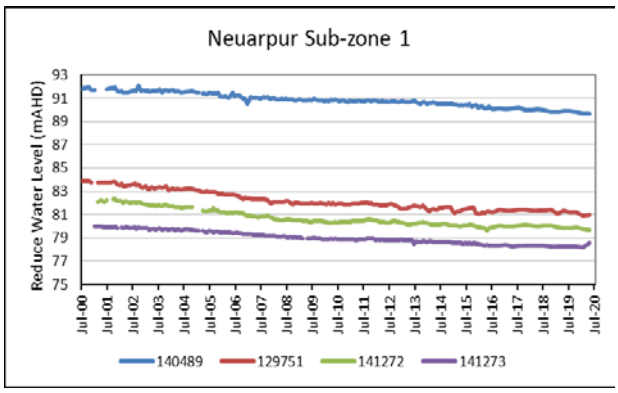


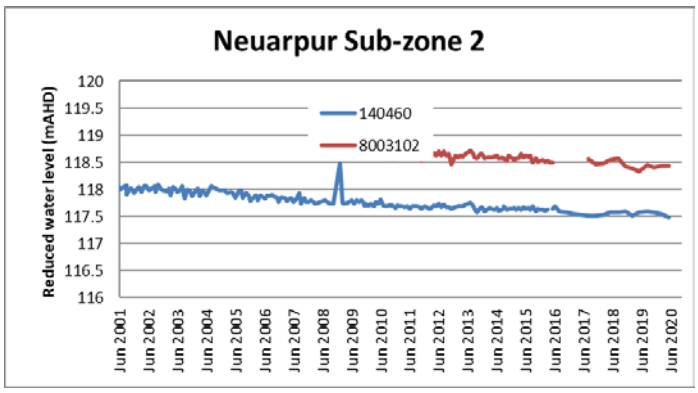






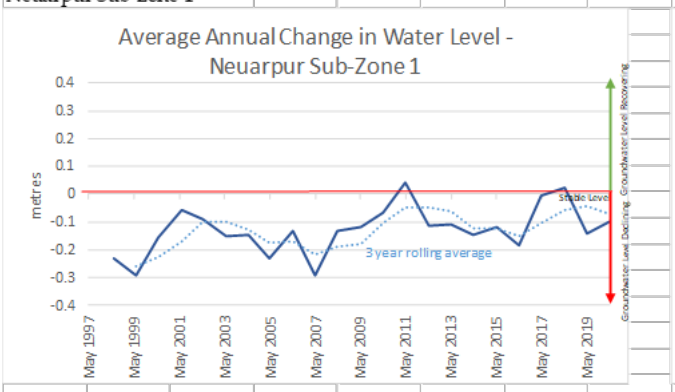


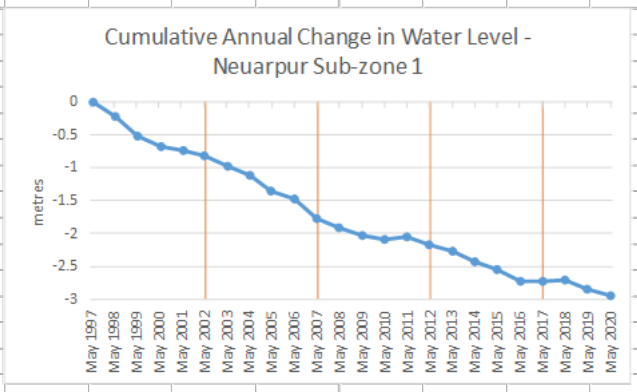




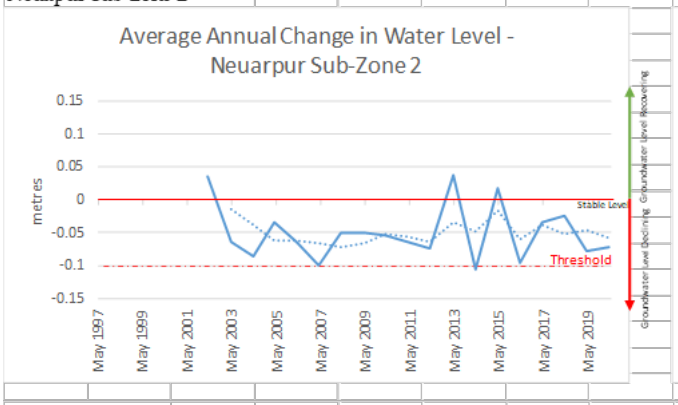
A1.3: Yearly groundwater level trend analysis - representative hydrographs for West Wimmera GMA zones and sub-zones

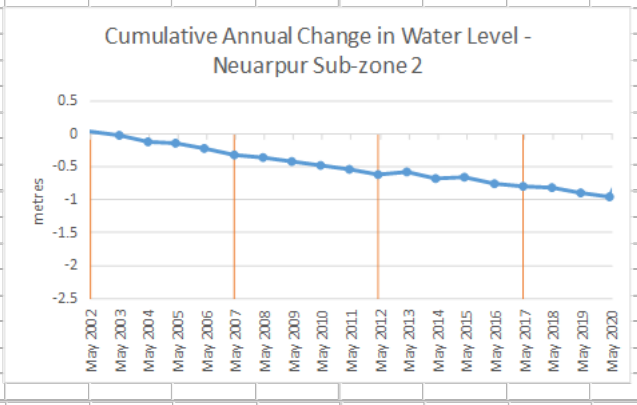
Neuarpur Sub-zone 1



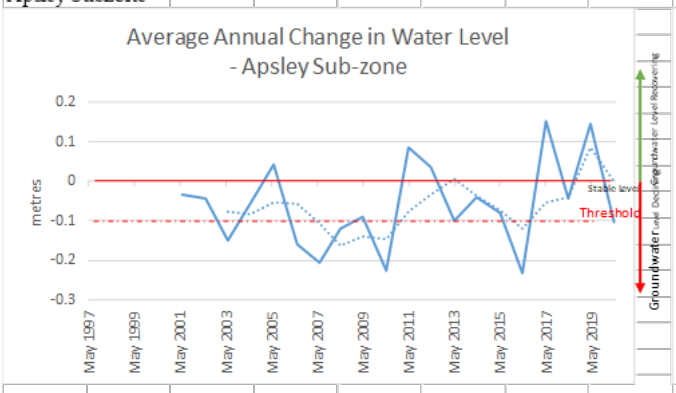


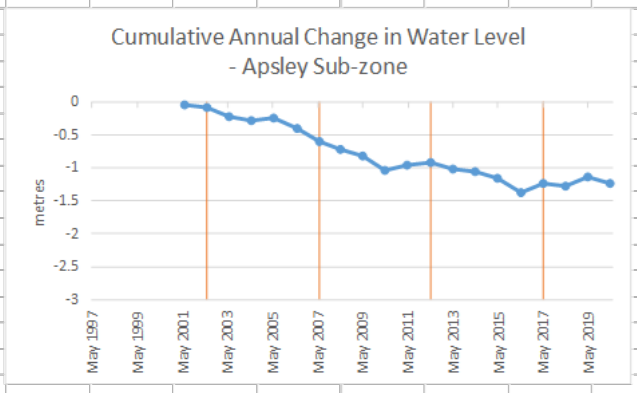
Neuapur Sub-zone 2



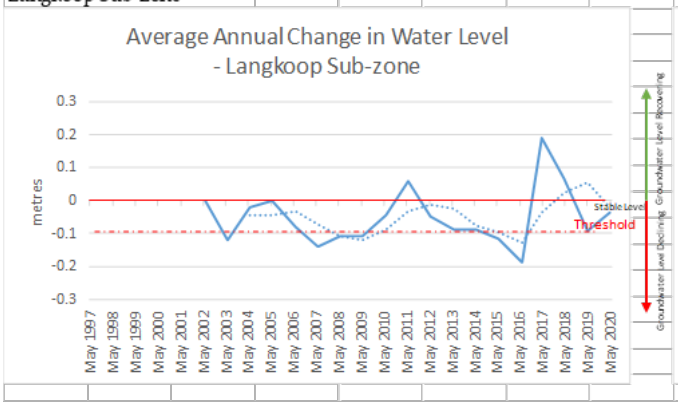


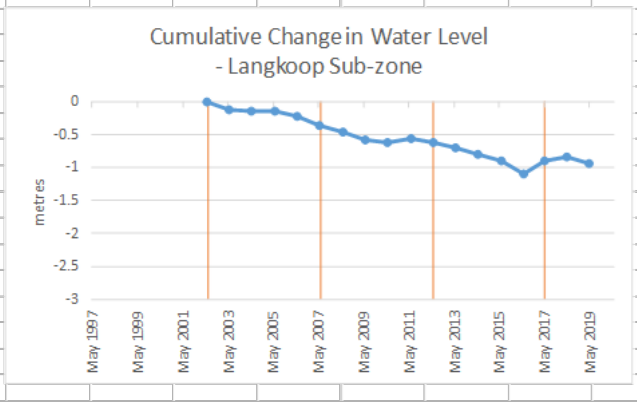
Apsley Subzone



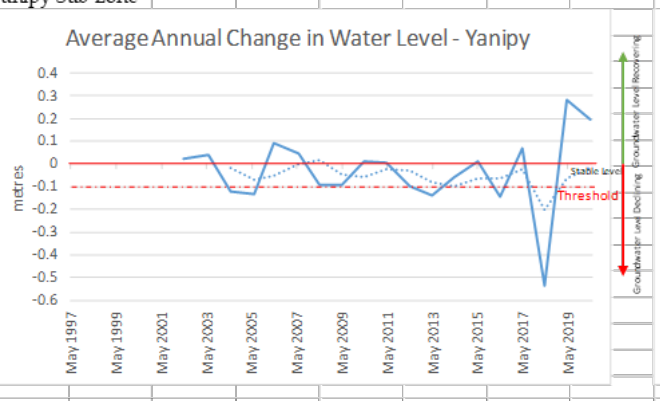


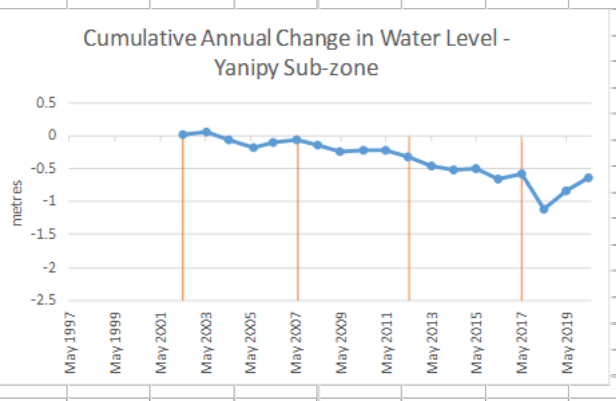
Langkoop Sub-zone



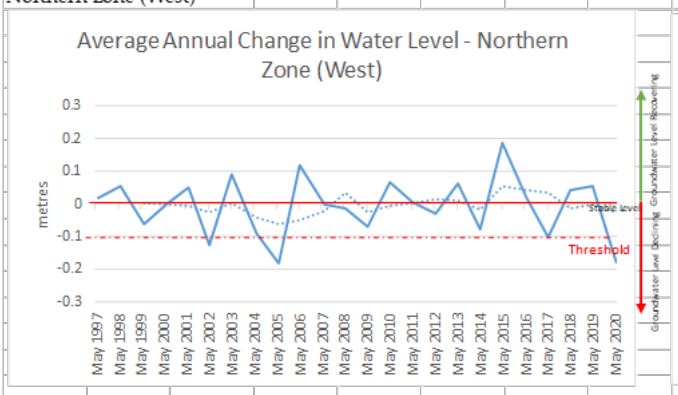


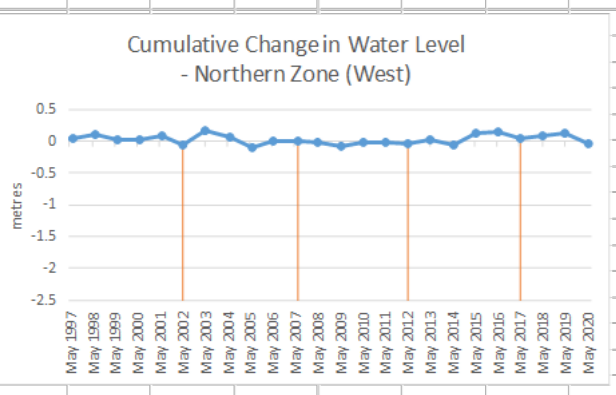
Yanipy Sub-zone



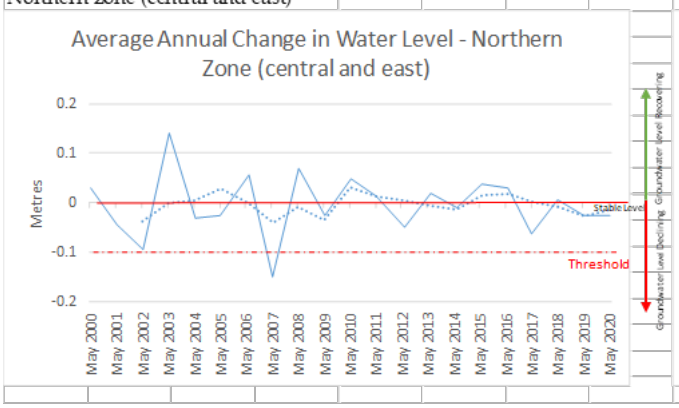


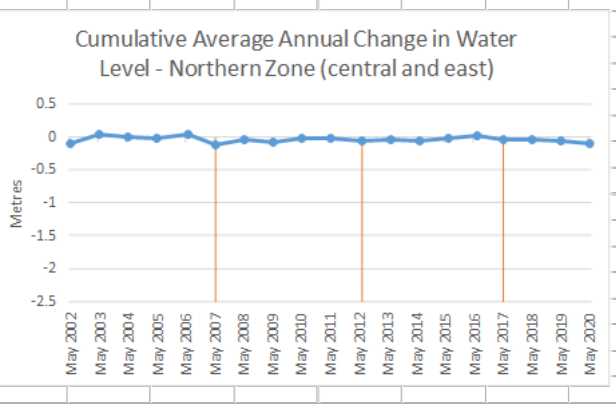
Northern zone (West)



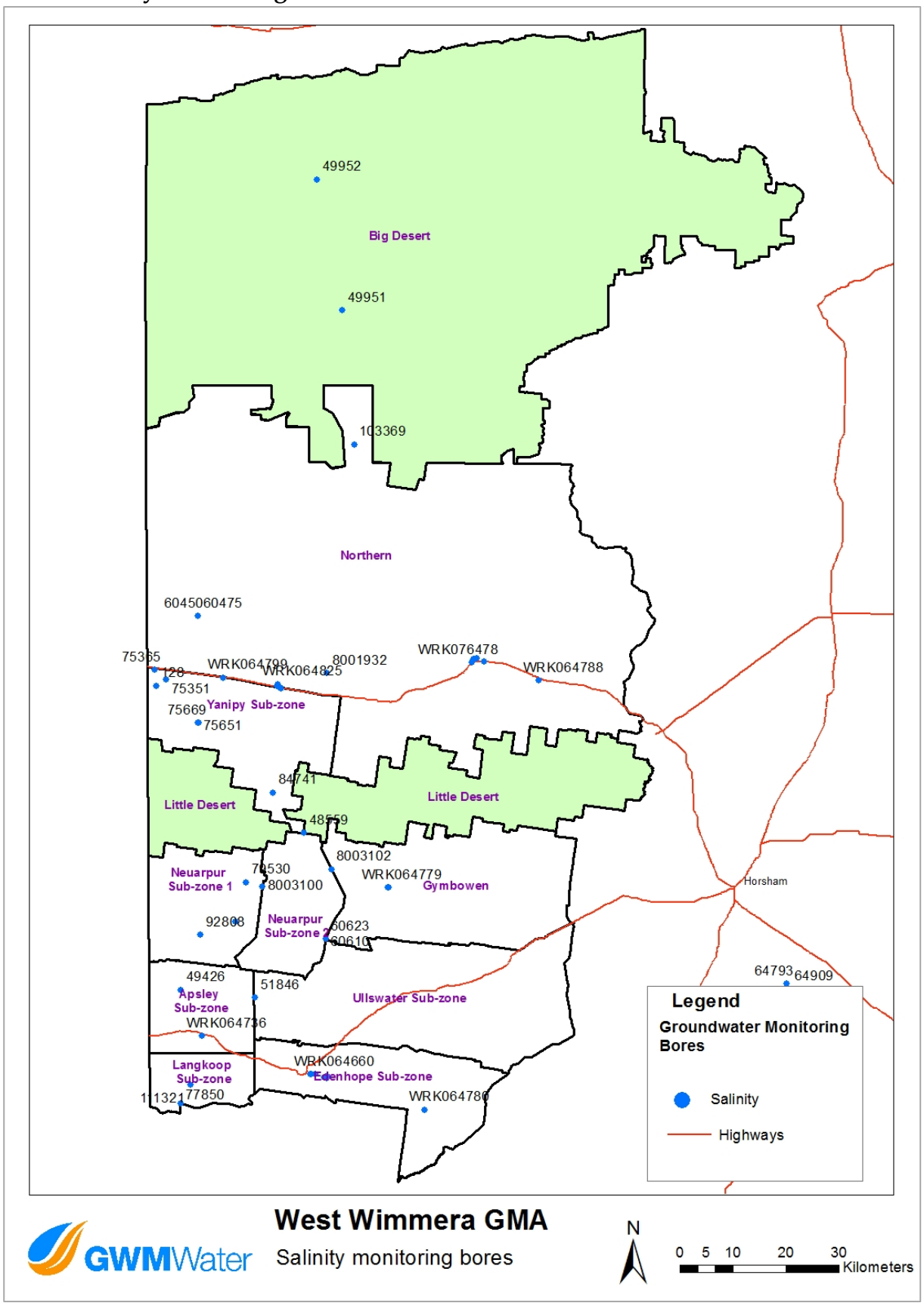
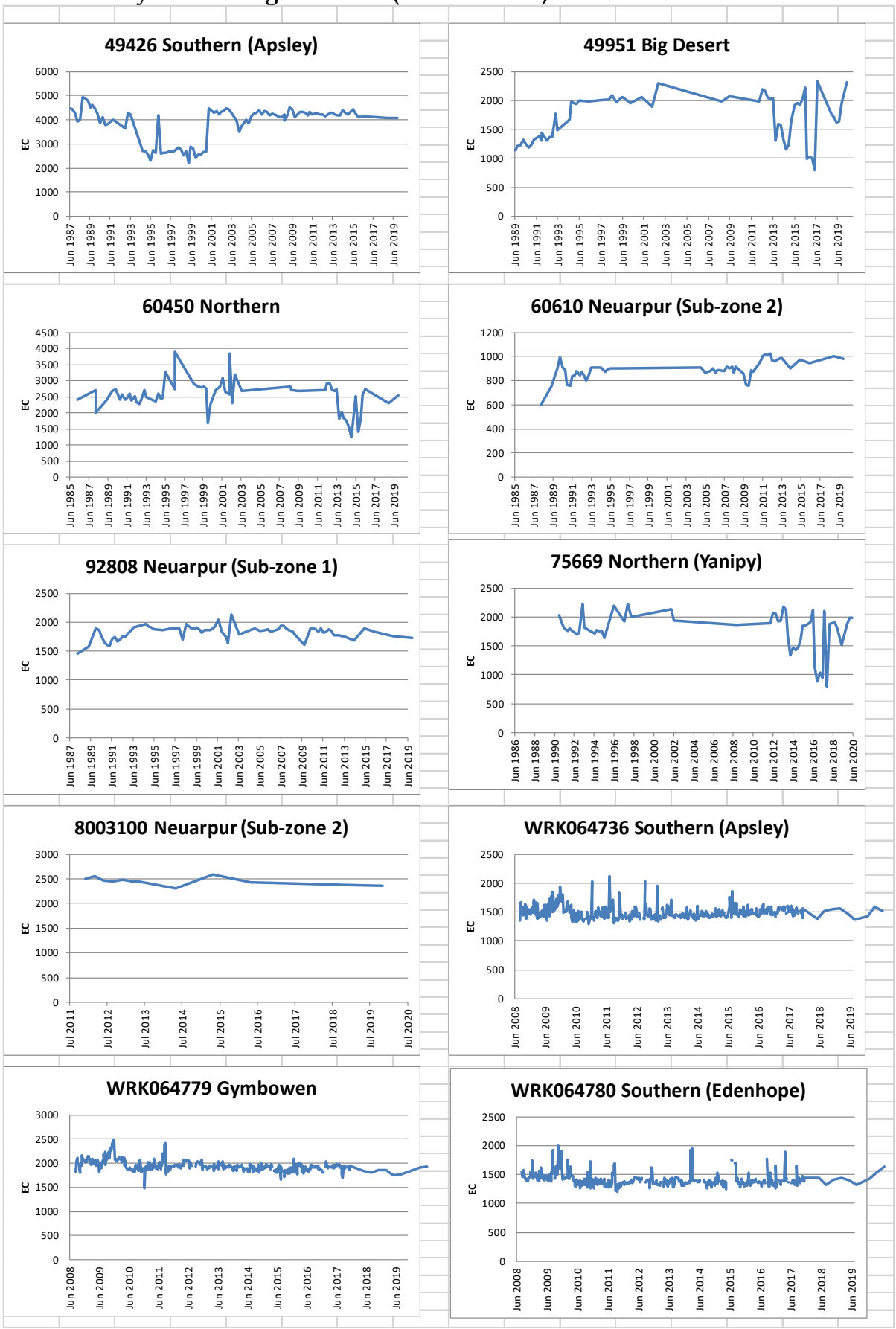


Northern zone (central and east)





Appendix 2
A2.1: Salinity monitoring locations



A2.2: Salinity monitoring bore data (selected sites)